

## IN THE CLAIMS

Please amend the claims as follows:

1. (currently amended) A In-a method for producing a quartz glass jig, said method comprising: processing a quartz glass raw material into a desired shape by a treatment inclusive of including fire working, annealing so as to remove for stress removal, and cleaning treatment to obtain the a final product, the method is characterized by that it comprises and performing a gas phase etching step and a gas phase purification step on a the surface layer of the quartz glass jig after applying the annealing treatment for stress removal but before the cleaning treatment, wherein the gas phase purification step is carried out continuously after the gas phase etching step.

2. (currently amended) A In-a method for producing a quartz glass jig, said method comprising: processing a quartz glass raw material into a desired shape by a treatment inclusive of including fire working, annealing so as to remove for stress removal, and cleaning treatment to obtain the a final product, the method is characterized by that it comprises and performing a gas phase etching step and a gas phase purification step on a the surface layer of the quartz jig after applying the annealing treatment for stress removal but before the cleaning treatment, wherein the gas phase purification step is carried out simultaneously with the gas phase etching step.

3. (currently amended) A In-a method for producing a quartz glass jig, said method comprising; processing a quartz glass raw material into a desired shape by a treatment inclusive of including of fire working, annealing so as to remove for stress removal, and cleaning treatment to obtain the final product, the method is characterized by that it comprises and performing a gas phase etching step and a gas phase purification step on a the surface layer of the quartz glass jig simultaneously with the annealing treatment for stress removal, wherein the gas phase purification step is carried out continuously after the gas phase etching step.

4. (currently amended) A In-a method for producing a quartz glass jig, said method comprising; processing a quartz glass raw material into a desired shape by a treatment inclusive of including fire working, annealing so as to remove for stress removal, and cleaning treatment to obtain the final product, the method is characterized by that it comprises and performing a gas phase etching step and a gas phase purification step on a the surface layer of the quartz glass jig simultaneously with the annealing treatment for stress removal, wherein the gas phase purification step is carried out simultaneously with the gas phase etching step.

5. (currently amended) A method for producing a quartz glass jig as claimed in Claim 1 one of Claims 1 to 4, wherein the gas phase etching step is performed in a the temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

6. (currently amended) A method for producing a quartz glass jig as claimed in Claim 5, wherein the gas gaseous atmosphere containing F is contains at least one type gas selected

from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ ,  $HF$ , and  $F_2$ .

7. (currently amended) A method for producing a quartz glass jig as claimed in Claim 1 one of Claims 1 to 6, wherein the gas phase purification step comprises performing high temperature heat treatment in a ~~the~~ temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

8. (currently amended) A method for producing a quartz glass jig as claimed in Claim 7, wherein the gas gaseous atmosphere containing Cl is  $HCl$ , and/or  $Cl_2$ , or a combination of HCl and Cl<sub>2</sub>.

9. (currently amended) A method for producing a quartz glass jig as claimed in Claim 5 one of Claims 5 to 8, wherein the gas gaseous atmosphere containing F further includes a gas containing H.

10. (currently amended) A quartz glass jig produced by a method for producing quartz glass jigs as claimed in Claim 1 one of Claims 1 to 9, wherein the quartz glass raw material is naturally occurring quartz glass containing Li, Na, Mg, K, Fe, Cr, Ni, and Cu within a depth range from a surface of the quartz glass raw material to a depth of 100 µm, each at a respective concentration ~~concentrations~~ less than 50 ppb.

11. (currently amended) A synthetic quartz glass jig produced by a method for producing quartz glass jig as claimed in Claim 1 one of Claims 1 to 9, wherein the quartz glass raw material is synthetic quartz glass, said synthetic quartz glass which contains Li, Na, Mg, Al, K, Ca, Ti, Cr, Fe, Ni, and Cu within a depth range from a surface of the quartz glass raw material to a depth of 100  $\mu\text{m}$ , each at a respective concentration concentrations less than 50 ppb.

12. (new) A method for producing a quartz glass jig as claimed in Claim 2, wherein the gas phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

13. (new) A method for producing a quartz glass jig as claimed in Claim 12, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $\text{C}_x\text{F}_y$ ,  $\text{Cl}_x\text{F}_y$ ,  $\text{N}_x\text{F}_y$ ,  $\text{Si}_x\text{F}_y$ ,  $\text{S}_x\text{F}_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $\text{CHF}_3$ , HF, and  $\text{F}_2$ .

14. (new) A method for producing a quartz glass jig as claimed in Claim 2, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

15. (new) A method for producing a quartz glass jig as claimed in Claim 14, wherein the gaseous atmosphere containing Cl is HCl,  $\text{Cl}_2$ , or a combination of HCl and  $\text{Cl}_2$ .

16. (new) A method for producing a quartz glass jig as claimed in Claim 12, wherein the gas gaseous atmosphere containing F further includes a gas containing H.

17. (new) A method for producing a quartz glass jig as claimed in Claim 3, wherein the gas phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

18. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ , HF, and  $F_2$ .

19. (new) A method for producing a quartz glass jig as claimed in Claim 3, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

20. (new) A method for producing a quartz glass jig as claimed in Claim 19, wherein the gaseous atmosphere containing Cl is  $HCl$ ,  $Cl_2$ , or a combination of  $HCl$  and  $Cl_2$ .

21. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gas gaseous atmosphere containing F further includes a gas containing H.

22. (new) A method for producing a quartz glass jig as claimed in Claim 4, wherein the gas

phase etching step is performed in a temperature range of from 0 °C to 1300 °C in a gaseous atmosphere containing fluorine (F).

23. (new) A method for producing a quartz glass jig as claimed in Claim 22, wherein the gaseous atmosphere containing F contains at least one gas selected from the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ , HF, and  $F_2$ .

24. (new) A method for producing a quartz glass jig as claimed in Claim 4, wherein the gas phase purification step comprises performing high temperature heat treatment in a temperature range of from 800 to 1300 °C in a gaseous atmosphere containing Cl.

25. (new) A method for producing a quartz glass jig as claimed in Claim 24, wherein the gaseous atmosphere containing Cl is HCl,  $Cl_2$ , or a combination of HCl and  $Cl_2$ .

26. (new) A method for producing a quartz glass jig as claimed in Claim 17, wherein the gas gaseous atmosphere containing F further includes a gas containing H.